

What is claimed is:

1. A catalyst for the manufacture of alkylene oxide by the vapor-phase epoxidation of alkene, said catalyst comprising impregnated silver and at least one efficiency-enhancing promoter on a refractory solid support, said support incorporating a sufficient amount of zirconium component to enhance at least one of catalyst activity, efficiency and stability as compared to a similar catalyst which does not contain the zirconium component, said zirconium component being present in the support substantially as zirconium silicate.
2. The catalyst of claim 1 wherein the alkylene oxide is ethylene oxide.
3. The catalyst of claim 1 wherein the alkylene oxide is propylene oxide.
4. The catalyst of claim 1 wherein the impregnated silver is present from about 2 to 60 % by weight of the catalyst.
5. The catalyst of claim 4 wherein the impregnated silver is present from about 5 to 50 % by weight of the catalyst.
6. The catalyst of claim 5 wherein the impregnated silver is present from about 10 to 40 % by weight of the catalyst.
7. The catalyst of claim 1 wherein at least one of the efficiency enhancing promoters comprises at least one alkali metal, alkaline earth metal and/or oxyanion of an element, other than oxygen, having an atomic number of 5 to 83 and being selected from groups 3b through 7b and 3a through 7a of the Periodic Table.
8. The catalyst of claim 1 wherein at least one of the efficiency-enhancing promoters is a member of a redox-half reaction pair.
9. The catalyst of claim 7 wherein at least one of the efficiency-enhancing promoters is a rhenium component.
10. The catalyst of claim 1 wherein the said refractory solid support, exclusive of zirconium component, is at least 95 % by weight alpha alumina.
11. The catalyst of claim 10 wherein the said refractory solid support, exclusive of zirconium component, contains less than about 2000 ppmw calcium.
12. The catalyst of claim 11 wherein the said refractory solid support, exclusive of zirconium component, contains less than about 350 ppmw calcium.

13. The catalyst of claim 10 wherein the said refractory solid support, exclusive of zirconium component and calcium compounds, contains less than about 500 ppmw alkaline earth metal, measured as the alkaline earth metal oxide.
- 5 14. The catalyst of claim 1 wherein the said refractory solid support, exclusive of zirconium component, is at least 99 % by weight alpha alumina.
15. The catalyst of claim 14 wherein the said refractory solid support, exclusive of zirconium component, contains less than about 2000 ppmw calcium.
16. The catalyst of claim 15 wherein the said refractory solid support exclusive of zirconium component contains less than about 350 ppmw calcium.
- 10 17. The catalyst of claim 14 wherein the said refractory solid support, exclusive of zirconium component and calcium compounds, contains less than about 500 ppmw alkaline earth metal, measured as the alkaline earth metal oxide.
18. The catalyst of claim 14 wherein the refractory solid support has a morphology comprising interlocking platelets of alpha-alumina.
- 15 19. The catalyst of claim 1 wherein the said refractory solid support has a surface area of at least about 0.4 m²/g, a pore volume of at least about 0.5 cc/g, and a median pore diameter between about 1 to 25 microns.
- 20 20. The catalyst of claim 1 wherein the zirconium component comprises from about 0.01 to 10.0 % by weight of zirconium silicate based on the total weight of the support.
21. The catalyst of claim 20 wherein the zirconium component comprises from about 0.1 to 5.0 % by weight of zirconium silicate based on the total weight of the support.
22. The catalyst of claim 21 wherein the zirconium component comprises from about 0.3 to 3.0 % by weight of zirconium silicate based on the total weight of the support.
23. The use of the catalyst of claims 1 to 22 for the manufacture of alkylene oxide by the vapor-
25 phase epoxidation of alkene.
24. The use of claim 23 wherein said alkylene oxide is ethylene oxide.